

**WHAT IS CLAIMED IS:**

1. A method for a thermo-electric cooler coupled to a laser diode, the method comprising:  
operating the thermo-electric cooler in one of at least a low power mode and a standard mode, the laser diode configured to transmit signals in the low power mode and the standard mode; and  
switching between the low power mode and the standard mode, wherein:  
the low power mode maintains a laser diode at a temperature within a predetermined range of temperatures; and  
the standard mode maintains the laser diode at a temperature that corresponds to a predetermined wavelength of light output from the laser diode.

2. The method of claim 1 wherein the low power mode is a Time Division Multiplexing (TDM) mode.

3. The method of claim 1 wherein the standard mode is a Dense Wavelength Division Multiplexing (DWDM) mode.

4. The method of claim 1 further comprising:  
operating the thermo-electric cooler in a quasi-standard mode, the laser diode configured to transmit signals in the quasi-standard power mode.

5. The method of claim 1 wherein laser diode is configured in an OC-192 transceiver line card disposed in a synchronous optical network (SONET) communication system.

6. The method of claim 1 wherein the predetermined range of temperatures is a range of temperatures within which the laser diode has a user-defined power versus performance ratio.

7. The method of claim 1 wherein the predetermined range of temperatures are input by one of a user and a system generated source.

1           8.       The method of claim 1 wherein the predetermined range of  
2 temperatures is determined by a user setting a temperature measure above and below  
3 a fixed temperature that corresponds to a wavelength of light output from the laser  
4 diode.

*Amended*  
1           9.       An apparatus comprising:  
2 means for operating a thermo-electric cooler coupled to a laser diode in one of  
3 a low power mode and a standard mode; and  
4 means for switching between the low power mode and the standard mode,  
5 wherein the low power mode maintains the laser diode at a temperature  
6 within a predetermined range of temperatures and the standard mode  
7 maintains the laser diode at a temperature that corresponds to a  
8 predetermined wavelength of light output from the laser diode.

1           10.      The apparatus of claim 9 wherein the predetermined range of  
2 temperatures is determined by a user setting a temperature measure above and below  
3 a fixed temperature that corresponds to a wavelength of light output from the laser  
4 diode.

1           11.      The apparatus of claim 9 wherein the low power mode is a Time  
2 Division Multiplexing (TDM) mode.

1           12.      The apparatus of claim 9 wherein the standard mode is a Dense  
2 Wavelength Division Multiplexing (DWDM) mode.

1           13.      The apparatus of claim 9 wherein laser diode is configured in an OC-  
2 192 transceiver line card disposed in a synchronous optical network (SONET)  
3 communication system.

*Amended*  
1           14.      An optical transceiver comprising:  
2 a temperature circuit;  
3 a thermo-electric cooler coupled to the temperature circuit; and

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4 a laser diode coupled to the thermo-electric cooler, wherein the thermo-  
5 electric cooler is responsive to inputs from the temperature circuit, the  
6 inputs identifying one of at least a first mode and a second mode,  
7 wherein a choice of mode is a function of a performance requirement.

1 15. The optical transceiver of claim 14 wherein the performance  
2 requirement is one of the first mode, wherein the first mode is a standard mode for  
3 dense wavelength division multiplexing (DWDM) applications, and the second mode,  
4 wherein the second mode is a low-power mode for time domain multiplexing (TDM)  
5 applications.

1 16. The optical transceiver of claim 14, further comprising:  
2 a temperature circuit, the temperature circuit including a switch configured to  
3 alter the thermo-electric cooler between the first mode and the second  
4 mode.

1 17. The optical transceiver of claim 14 wherein the second mode is a dense  
2 wavelength division multiplexing (DWDM) mode and the first mode is a time-  
3 division multiplexed (TDM) mode.

1 18. The optical transceiver of claim 14 further comprising:  
2 a coupler coupled to the laser diode, the lens producing an optical signal; and  
3 an optical fiber coupled to the coupler; and  
4 a wavelength signal circuit coupled to the coupler and the temperature circuit,  
5 the wavelength signal circuit configured to transmit feedback to the  
6 temperature circuit to maintain a stable wavelength of the laser diode.

1 19. The optical transceiver of claim 14 wherein the optical transceiver is  
2 disposed on an OC-192 transceiver line card of a synchronous optical network  
3 (SONET) communication system.

1 20. The optical transceiver of claim 14 wherein the first mode is a low-  
2 power mode and the second mode is a standard mode, the first mode configured to  
3 permit a predetermined amount of wavelength drift.

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1 21. The optical transceiver of claim 14 wherein the first mode is a low-  
2 power mode in which the thermo-electric cooler dissipates less than 5 Watts under  
3 normal operating conditions.

1 22. The optical transceiver of claim 14 wherein the low power mode  
2 permits wavelength drift within operable parameters.

1 23. A method for providing thermo-electric cooled system for operating a  
2 laser diode comprising:  
3 operating a laser diode in one of a first mode and a second mode wherein the  
4 choice of mode is function of a user-defined power and performance  
5 ratio.

1 24. The method of claim 23 wherein the function is a ratio of power versus  
2 performance wherein the power required to cool a laser diode is compared with the  
3 performance required for one of a plurality of laser diode applications.

1 25. The method of claim 24 wherein the plurality of laser diode  
2 applications include time division multiplexing (TDM), dense wavelength division  
3 multiplexing (DWDM) and wavelength division multiplexing (WDM) applications.